ABSTRACT

Objective: Describe the functional outcomes of patients with contained lumbar disc herniation (L4-L5, L5-S1) treated with manual percutaneous nucleotomy (MPN) and demonstrate that it remains a technique with good results. Methods: A prospective, longitudinal study with 110 patients contained with lumbar disc herniation (LDH) treated with (MPN). The evaluation was pre-surgical and 4, 30, 180 and 365 days after the surgery. We used Numeric Pain Scale (NPS), Oswestry Disability Index (ODI) and Macnab criteria. Descriptive and inferential statistics for differences. Results: N=110: 58 (52.72%) men, 52 (47.27%) women; average age 37.95 years (14–56) ± 10.60; most affected level: L4-L5 in 63 (57.14%) patients. NPS preoperative average: 7.75 (5-9) ± 1.12, and at 365 days: 2.14 (0-7) ± 2.37. The mean preoperative ODI was 37% (28%-40%) ± 3.06, and at 365 days 9.52% (0%-40%) ± 13.92. The prognosis (ODI) was good to 79 (71.81%) patients at 365 days, regular in 26 (23.63%) and poor in 5 (4.57%), corresponding respectively to patients with no, moderate and severe disability. The Macnab criteria showed similar results (p = 0.00, 95% CI 0.00 to 0.13 - Student’s t). Conclusions: The results were good at one-year follow-up (p = 0.00), demonstrating that the MPN is still a good option for lumbosciatic pain relief.

Keywords: Diskectomy; Percutaneous; Intervertebral disc; Hernia; Low back pain.

RESUMO

Objetivos: Desceresser os resultados funcionais dos pacientes com hérnia de disco lombar contida (L4-L5, L5-S1) tratada com nucleotomia percutânea manual (MPN) e demonstrar que continua sendo uma técnica com bons resultados. Métodos: Estudo prospectivo, longitudinal com 110 pacientes com hérnia de disco lombar (HDL) contida tratados com NPM. A avaliação foi pré-cirúrgica e 4, 30, 180 e 365 dias depois da operação; utilizamos Escala Numérica de Dor (END), Índice de Incapacidade Funcional de Oswestry (ODI) e critérios de Macnab. Estatística descritiva e inferencial para diferenças. Resultados: N=110: 58 (52.72%) homens, 52 (47.27%) mulheres; média de idade 37,95 anos (14–56) ± 10.60; nível mais afetado: L4-L5 em 63 (57,14%) pacientes. END pré-operatório média: 7,75 (5-9) ± 1,12; aos 365 dias: 2,14 (0-7) 2,37. O ODI pré-operatório médio foi 37% (28%-40%) ± 3,06, e aos 365 dias 9,52% (0%-40%) ± 13,92. O prognóstico (ODI) foi bom a 79 (71,81%) pacientes a 365 depois da operação, regular em 26 (23,63%) e ruim em 5 (4,57%), correspondendo, respectivamente, a pacientes sem incapacidade ou leve, moderada e severa. Os critérios de Macnab mostraram resultados semelhantes (p = 0,00, IC 95% 0,00-0,13 - t do Student). Conclusões: Os resultados foram bons em um ano de acompanhamento (p = 0,00), demonstrando que a NPM continua sendo uma boa opção para o alívio da dor lombociática por HDL.

Descritores: Discotomia percutânea; Disco intervertebral; Hérnia; Dor lombar.

Original Article / Artigo Original / Artículo Original

PERCUTANEOUS DISCECTOMY: A CURRENT TREATMENT FOR LUMBAR DISC HERNIATION

DISCOTOMIA PERCUTÂNEA: TRATAMENTO VIGENTE PARA HÉRNIA DE DISCO LOMBAR

DISCECTOMÍA PERCUTÁNEA: UN TRATAMIENTO VIGENTE PARA LA HERNIA DISCAL LUMBAR

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INTRODUCTION

Low back pain has been identified as the main cause of disability in patients younger than 45 years of age and as the second greatest cause of lost days of work in the United States, affecting almost 10 million people at an estimated cost of more than 20 billion dollars. In Mexico, this disease and its treatment also causes an increase in the workload and consumption of resources. The epidemiology of low back pain is directly related to degenerative disorders of the intervertebral discs, among them herniated discs. The classical symptoms of a herniated lumbar disc can start with low back pain (lumbalgia) and evolve into radicular pain that we confirm clinically as typical symptoms of a herniated lumbar disc can start with low back pain (lumbalgia) and evolve into radicular pain that we confirm clinically.

Percutaneous nucleotomy is a minimally invasive disc decompression technique approved by the Food and Drug Administration (FDA) in the year 2000, defining it as any discectomy procedure not requiring open dissection of the thoracolumbar fascia. The technique was first developed by Hijikata, who performed percutaneous decompression and resection of the nucleus pulposus of the intervertebral disc following discography, reporting 60% to 65% satisfactory results in his case series. (Figures 1 and 2) The percutaneous nucleotomy, as a minimally invasive decompression technique, enables a reduction of pain and of the complications associated with open intervention (standard discectomy) and an earlier return to daily activities, in addition to reducing the total cost of medical treatment.

The objective of our study is to describe the functional outcomes of patients with contained lumbar disc hernia (L4-L5, L5-S1) treated with percutaneous manual nucleotomy (PMN) after one year of evolution and to demonstrate that it continues to be a viable technique with good results.

MATERIAL AND METHODS

Descriptive, longitudinal, prospective, cohort study including patients selected from the outpatient service with low back pain secondary to lumbar disc hernia of L4-L5 and L5-S1. We included those with only one level affected, with chronic lumbar sciatic pain previously treated with medications and rehabilitation for more than six months without good response, and who underwent percutaneous manual nucleotomy under fluoroscopy. We excluded those patients with changes in behavior, calcified or non-contained hernias, narrow lumbar canal, spondylolisthesis, congenital deformities, and instability. Patients who wished to leave the study, who did not attend follow-up, or who underwent surgical reintervention were eliminated. All the patients were diagnosed clinically and corroborated by plain radiographs and lumbar magnetic resonance without contrast.

We used a Numeric Pain Scale (NPS) to evaluate pain, the Oswestry Index (ODI) to evaluate functional disability, and the Macnab criteria for the therapeutic evaluation of the clinical results. The variables used were age, sex, symptom evolution time, complications, NPS, the Oswestry Scale, and the Macnab Criteria. In the numeric pain scale we considered zero to be without pain, 1 to 4 points as mild pain, 5 and 6 points as moderate pain, and 7 to 10 points as severe pain. For the Oswestry Disability Index, the percentage of disability was considered to be minimal from 0 to 20 points, moderate from 21 to 40 points, severe from 41 to 60 points, disability from 61 to 80 points, and exaggerated for 81 points and above. For the Macnab Criteria, results were considered to be excellent when the patient presented no pain or restriction of activity, good when there was occasional pain in the lower back or legs sufficient enough to interfere with the patient’s daily life activities or their ability to enjoy leisure time, normal with improved functional capacity but with intermittent pain severe enough to limit or modify work or leisure activities, and poor when there was no improvement or the improvement was not enough to permit increased activity and a new surgical intervention may be necessary.

The NPS and Oswestry scales were applied preoperatively to the patients who met the inclusion criteria, and then at 4, 30, 180, and 365 days following surgery and the results were noted on a data collection sheet. We used the SPSS v 22 program from IBM. For the purpose of this study, we considered the results to be good when there was a reduction of 4 points compared to the initial score, when a return to normal activities was possible, and when there were no signs of radicular compression or functional limitation (NPS of 0 to 4 and Oswestry of 0 to 20). The project was submitted to and approved by the Institutional Review Board of the Hospital Germán Díaz Lombardo (HGDLP001), and complies with the ethical and design aspects according to the items registered in the following: Regulations of the General Health Law. According to the regulations of the General Health Law for Research Material, for health, Titles from the first to the sixth and ninth 1987. Technical Norm no. 313 for the submission of research projects and technical reports in health care institutions. Federal regulation: title 45, section 46 and what is consistent with good clinical practices.
RESULTS

There were a total of 100 patients, 58 of whom (52.73%) were men and 52 of whom (47.27%) were women, with an average of 37.95 years of age (minimum 14 – maximum 56, SD = 10.60 years), all operated at one level. The average results of the NPS were 7.75 (minimum 5 - maximum 9), SD 1.12 prior to surgery, 2.43 (minimum 0 - maximum 7) SD 1.88 at 4 days, 2.05 (minimum 0 - maximum 7) SD 2.24 at 30 days, 2.10 (minimum 0 - maximum 7) SD at 180 days, and 2.14 (minimum 0 - maximum 7) SD 2.37 at 365 days. The differences between the NPS values measured prior to surgery and at 365 days are shown in Table 1.

In our study, the average age of the patients was 37.95 years, and publications, maintaining the anonymity of the participants”. The letter of informed consent was accepted.

With respect to the Oswestry Disability Index, the average reduction in the percentage of disability was significant from the first postoperative evaluation (4 days following surgery, p=0.000) and continued until disability reached a reduction of 26 percentage points (p=0.00) at one year following surgery, as shown in Table 3, reflecting an improvement in disability from this surgical technique in patients with low back disc hernia.

The differences between the preoperative and postoperative ODI (4, 30, 180, 365 days) were similar and statistically significant (p=0.00), as can be observed in Table 1. With respect to the Oswestry Disability Index, the average reduction in the percentage of disability was significant from the first postoperative evaluation (4 days following surgery, p=0.000) and continued until disability reached a reduction of 26 percentage points (p=0.00) at one year following surgery, as shown in Table 3, reflecting an improvement in disability from this surgical technique in patients with low back disc hernia.

The difference between the preoperative and postoperative ODI (4, 30, 180, 365 days) was similar and statistically significant (p=0.00) as shown in Table 2.

In our review of the literature, we found no studies that evaluated the Oswestry disability index, the numeric pain scale, or the Macnab criteria in patients who underwent mechanical percutaneous nucleotomy for lumbar disc hernia. However, other authors have used this for this type of patient, but with percutaneous nucleotomy guided by laser under fluoroscopy, endoscopy, or with dehydration of the intervertebral discs using chemical substances, making a comparison of these studies difficult. The therapeutic effectiveness of the preoperative Macnab criteria results compared to the postoperative results was good (p=0.00). We did not find any studies that included the numeric pain scale, Oswestry functional disability index, or Macnab criteria in a together in the same study in patients with low lumbar hernias treated with this technique. The success of this treatment in our series

<table>
<thead>
<tr>
<th>Time period reported</th>
<th>Mean (SD)</th>
<th>Deviation</th>
<th>95% CI</th>
<th>Inferior</th>
<th>Superior</th>
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<tbody>
<tr>
<td>Preoperative 365 days</td>
<td>5.429 (4.91)</td>
<td>2.249</td>
<td>4.405</td>
<td>6.452</td>
<td>11.062</td>
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<th>Time period reported</th>
<th>Mean (SD)</th>
<th>Deviation</th>
<th>95% CI for the difference</th>
<th>Inferior</th>
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<tr>
<td>Preoperative 365 days</td>
<td>5.42</td>
<td>4.40</td>
<td>6.45</td>
<td>11.06</td>
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<thead>
<tr>
<th>Time of evaluation</th>
<th>Average (SD)</th>
<th>Minimum</th>
<th>Maximum</th>
<th>SD</th>
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</thead>
<tbody>
<tr>
<td>Preoperative</td>
<td>36.8 (4.02)</td>
<td>28</td>
<td>40</td>
<td>34</td>
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<tr>
<td>30 days</td>
<td>8.80 (12.08)</td>
<td>0</td>
<td>34</td>
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<tr>
<td>180 days</td>
<td>10.40 (15.89)</td>
<td>0</td>
<td>40</td>
<td>15.89</td>
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<tr>
<td>365 days</td>
<td>10.6 (16.02)</td>
<td>0</td>
<td>40</td>
<td>15.89</td>
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Abbreviations: N=sample, SD=standard deviation, %= Percentage.
probably depends on proper selection and agrees with Alò et al.,4,5 Amoretti et al.,6 and Hijikata.14,15 Even though this procedure can have complications like discitis, neurological lesions, and vascular lesions, in this study there were no complications. In order to arrive at a complete, integrated evaluation of these patients, we took on the task of using the 3 evaluation scales, something that no study published in the literature has yet undertaken.

CONCLUSION

The clinical evolution of patients treated with percutaneous manual nucleotomy was good, yielding the therapeutic benefits reported in the literature. It is a minimally invasive surgical technique that should not fall into disuse given that it only requires the percutaneous nucleotomy tool and a fluoroscope to locate the anatomical landmarks. The proper selection of the patient will no doubt allow the maximum benefit to be obtained from the technique and for this reason we conclude that it continues to be a viable technique.

All authors declare that there are no potential conflicts of interest regarding this article.

AUTHORS’ CONTRIBUTION: Each author made significant individual contributions to the preparation of this manuscript. PGLR developed the concept and the study design. DBR and BHC performed the critical review and editing. JyVO reviewed the literature and collected the data. JARG and ICV collected the data. DFLL analyzed and interpreted the data.

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